United States Patent [19]

Thurber

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[54] **HANDGUN SAFETY DEVICE**

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[73] Assignee: **Firelock, Inc.,** Golden, Colo.

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[51] **Int. Cl.**[4] **F41C 17/08**

[52] **U.S. Cl.** **42/70.11;** 42/95

[58] **Field of Search** 42/70.11, 95, 96

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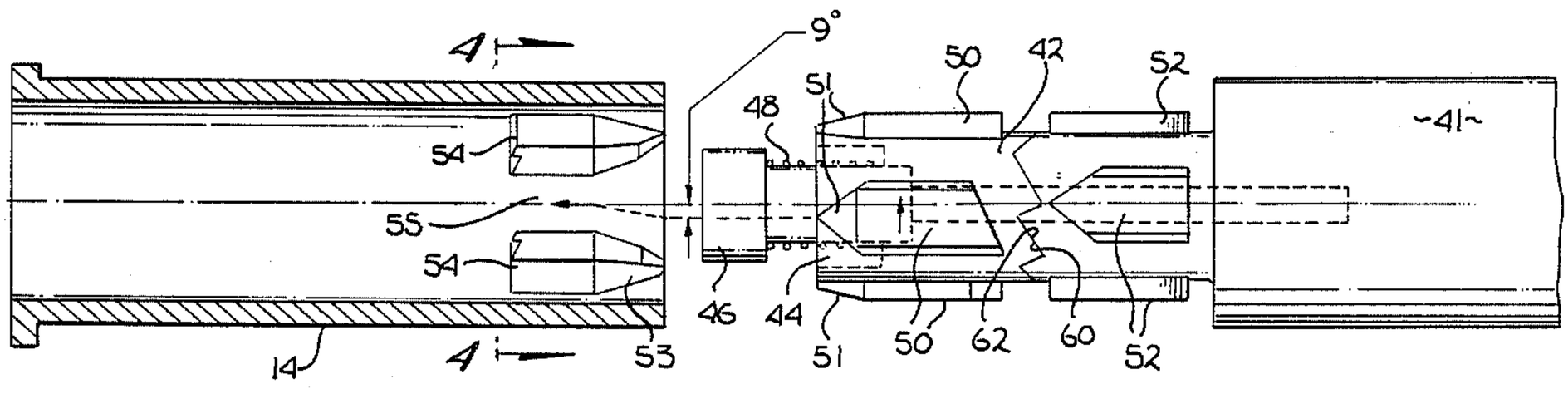
Assistant Examiner—Michael J. Carone
Attorney, Agent, or Firm—Blakely, Sokoloff, Taylor & Zafman

[57] **ABSTRACT**

An improved firing safety device for handguns is disclosed. The device prevents the accidental discharge of a gun by children, but is easily removable by an adult thereby allowing the gun to be safely stored in a loaded and fully assembled condition. The gun may thus be readied for use almost immediately. The device includes a cartridge which is inserted into the firing chamber and a rod which is inserted into the gun barrel. The end of the rod is captured by and locked within the cartridge thereby preventing the gun cylinder from revolving. The device is removeable by applying manual pressure to a cap at the front of the rod which releases the capture mechanism within the cartridge and allows the rod to be withdrawn from the gun barrel.

13 Claims, 4 Drawing Sheets



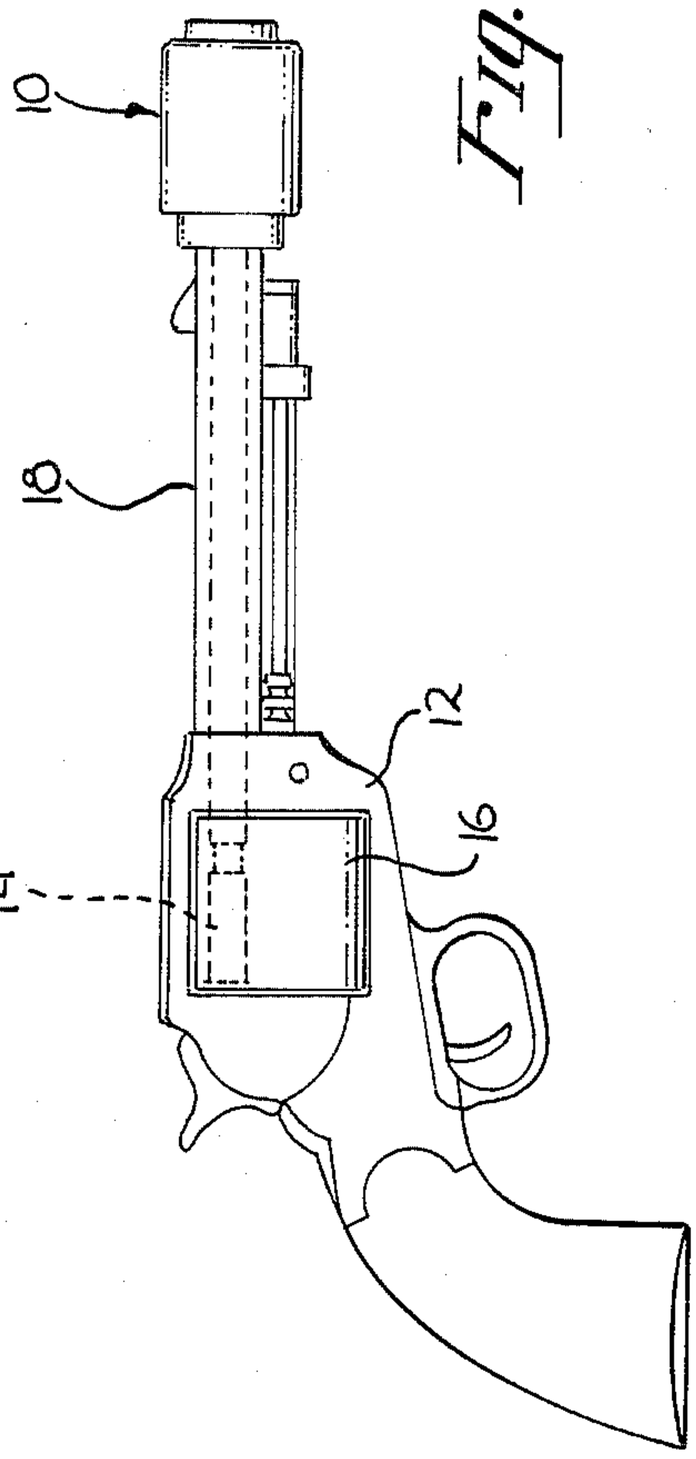


Fig. 1

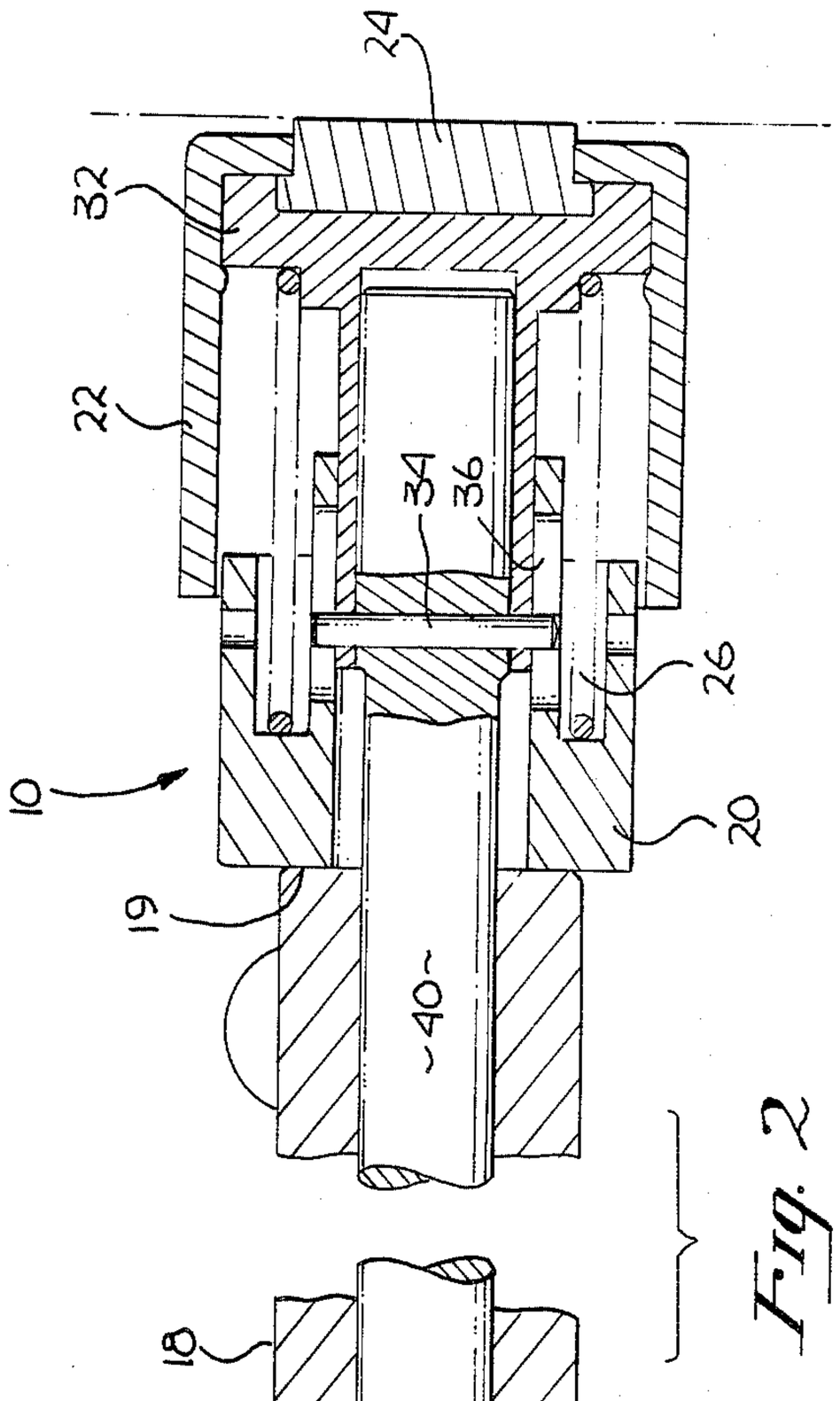


Fig. 2

Fig. 3

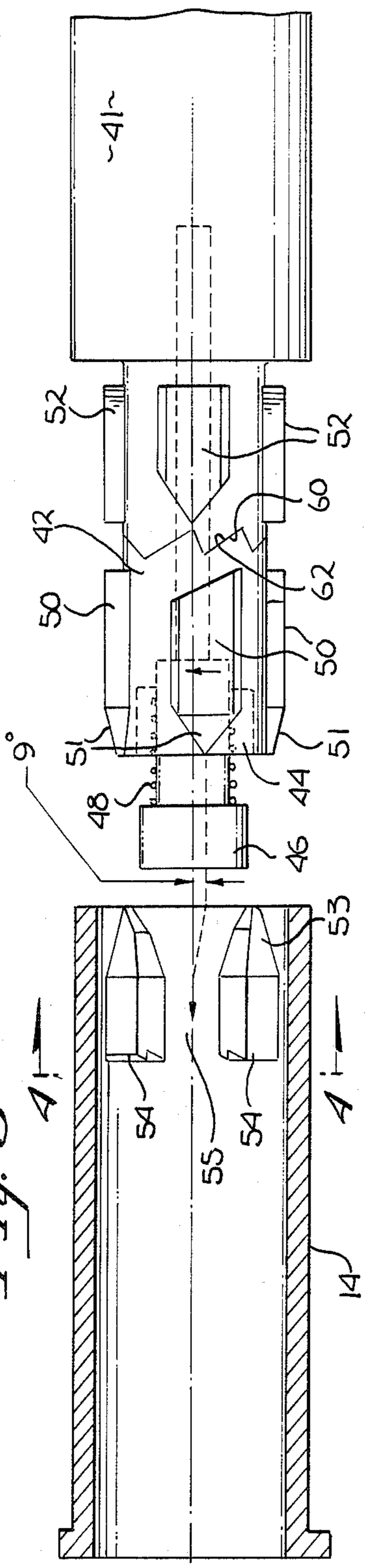


Fig. 5

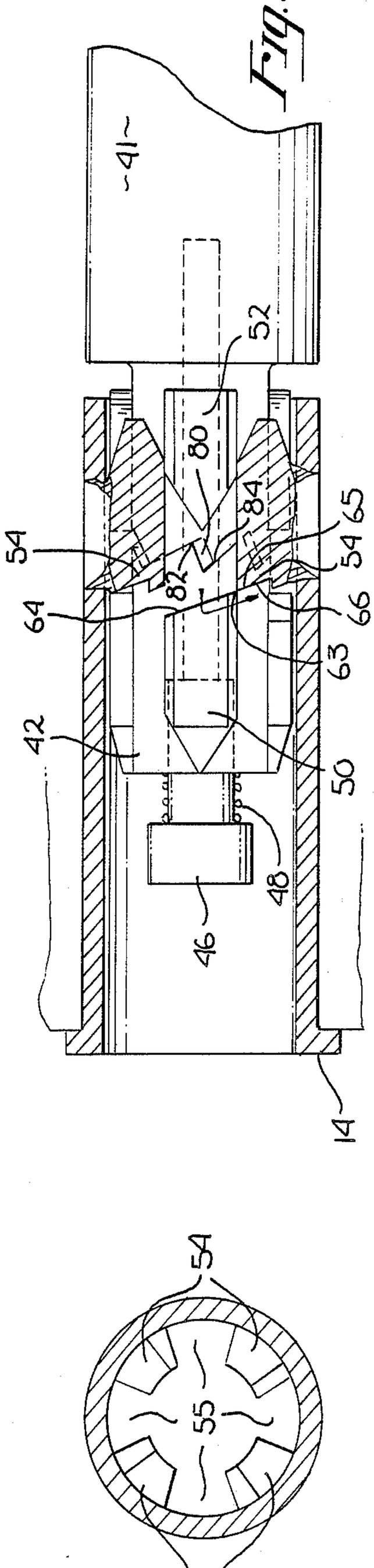


Fig. 6

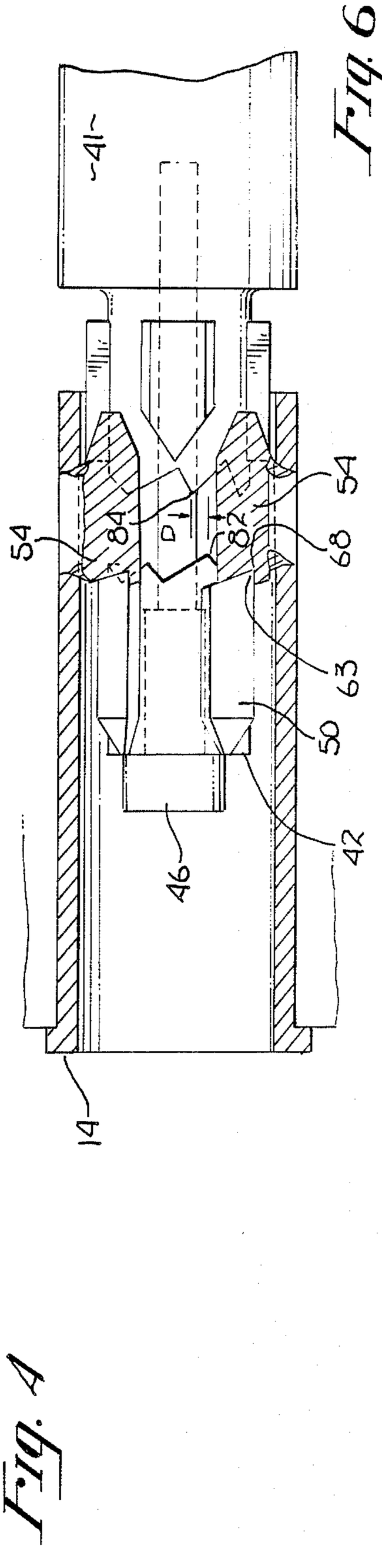


Fig. 4

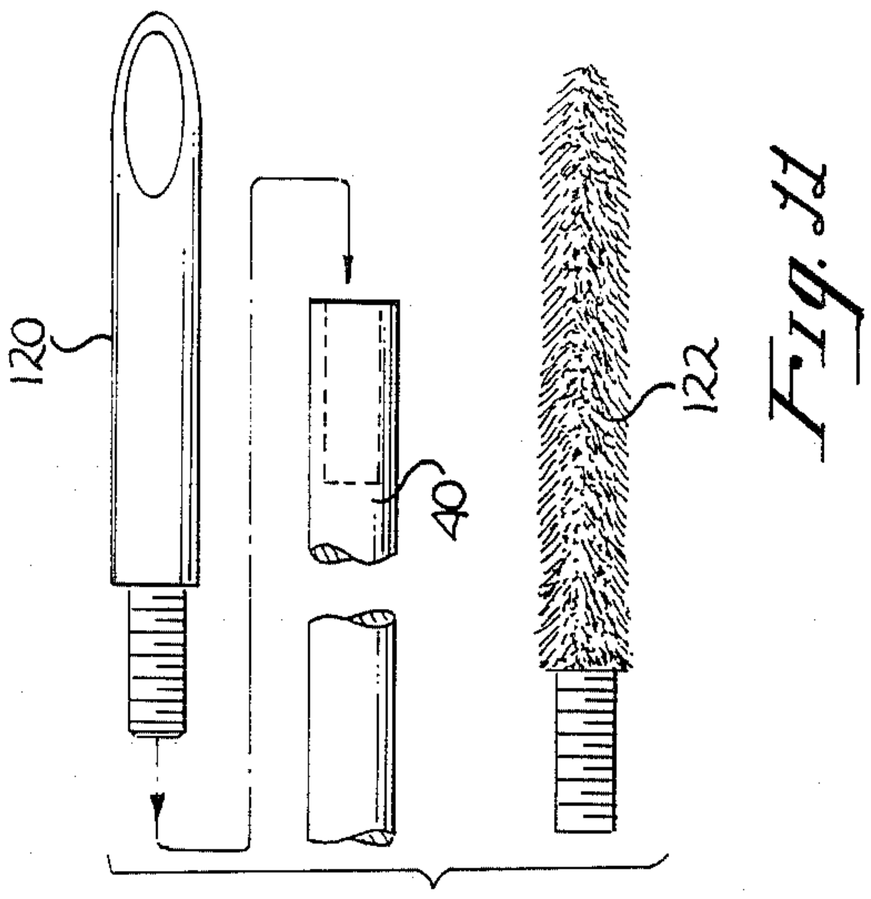


Fig. 11

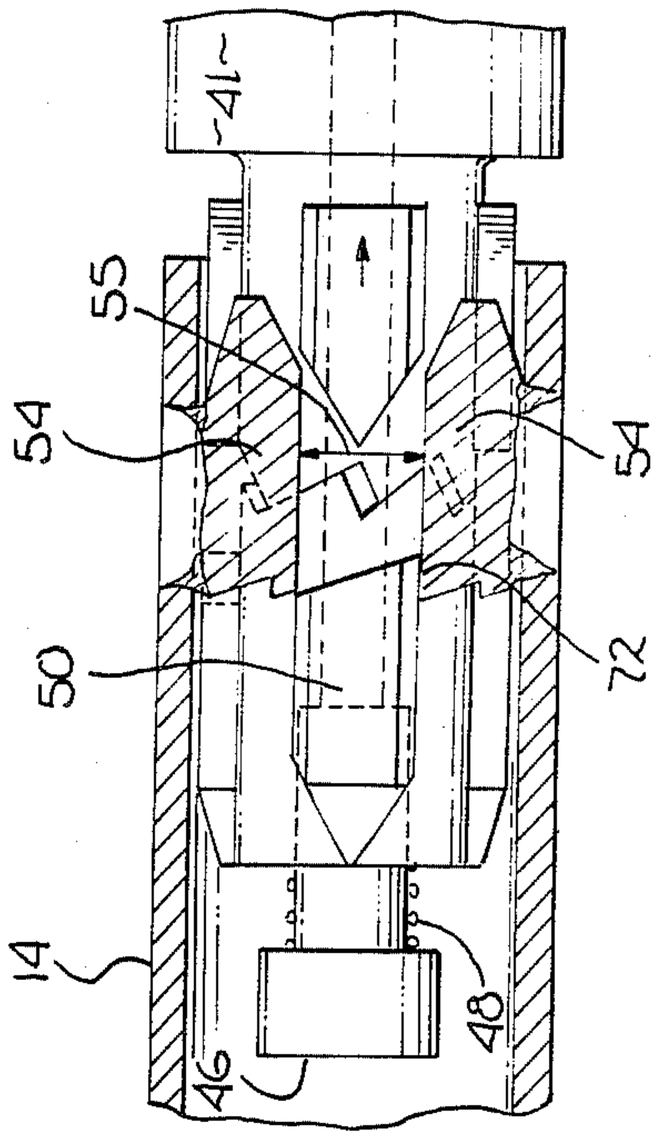
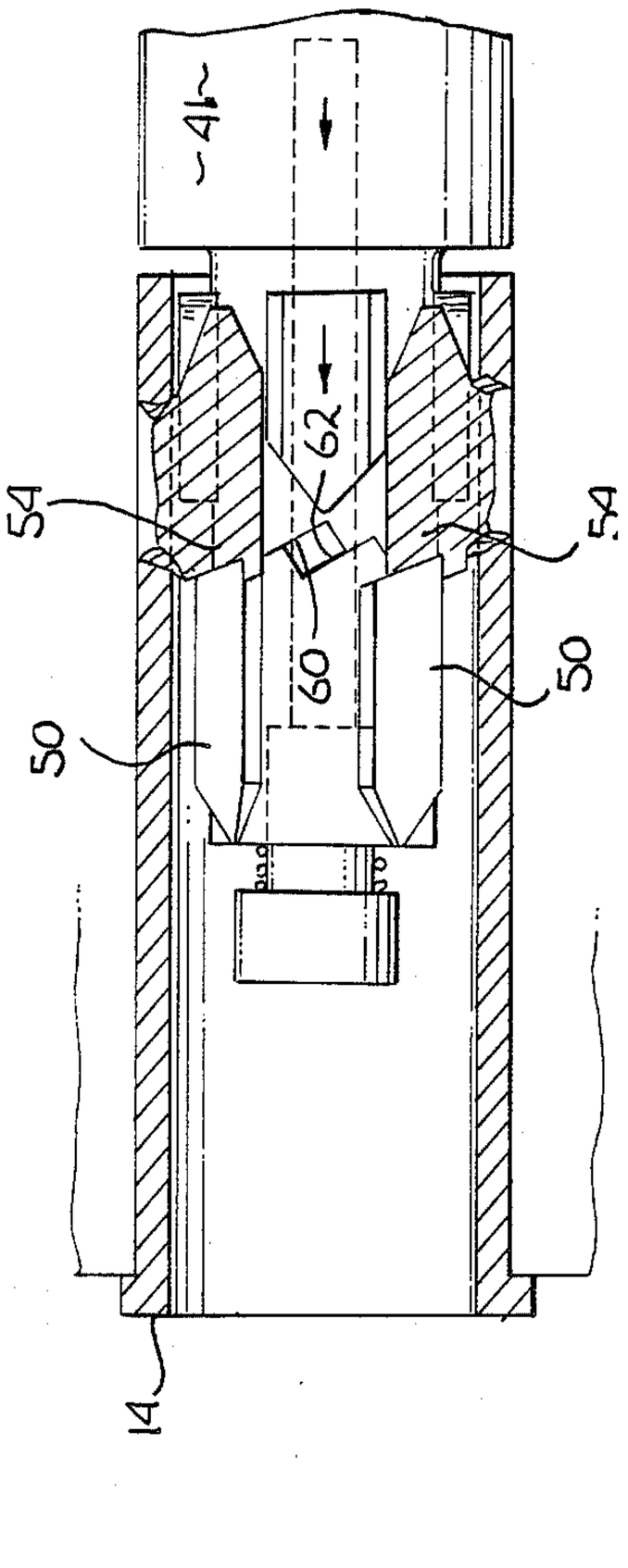


Fig. 9

Fig. 7



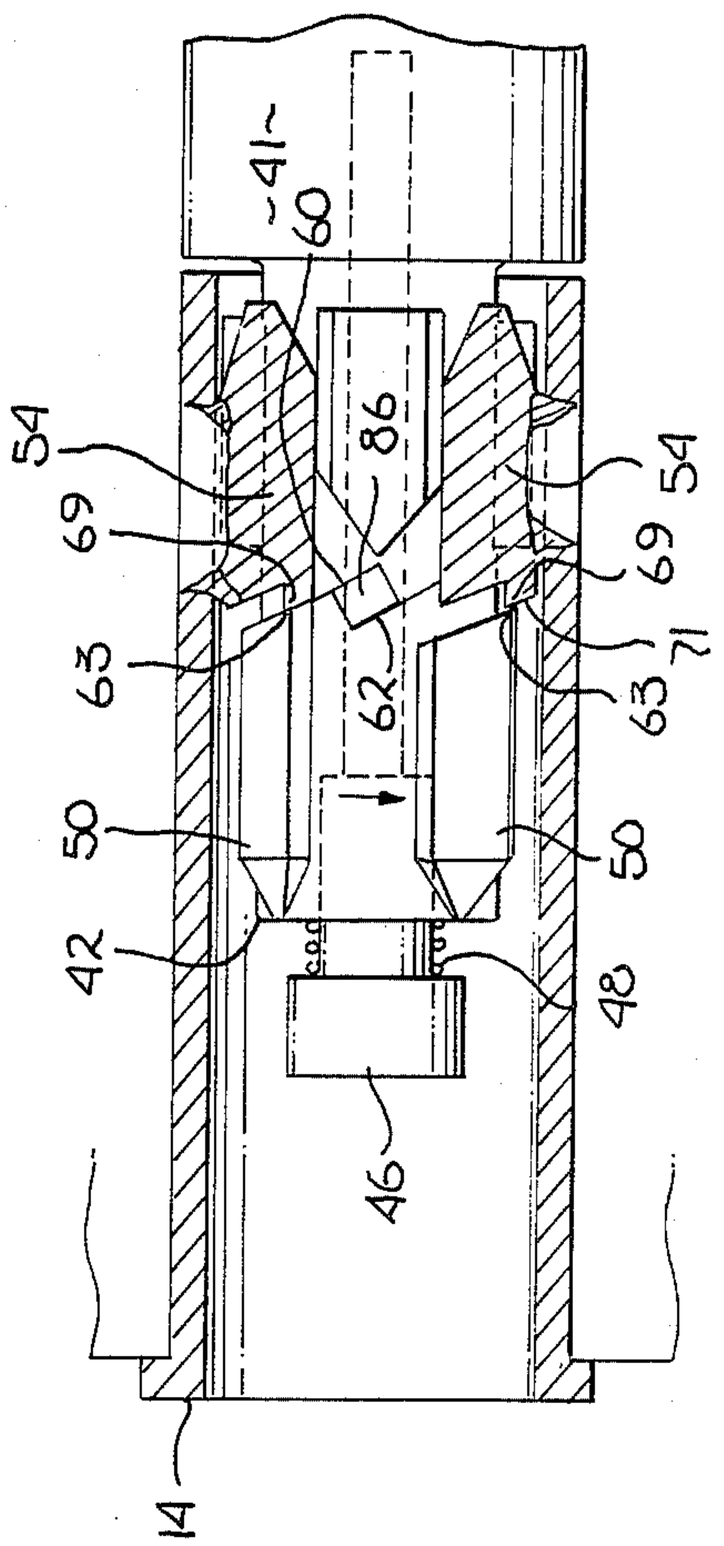


Fig. 8

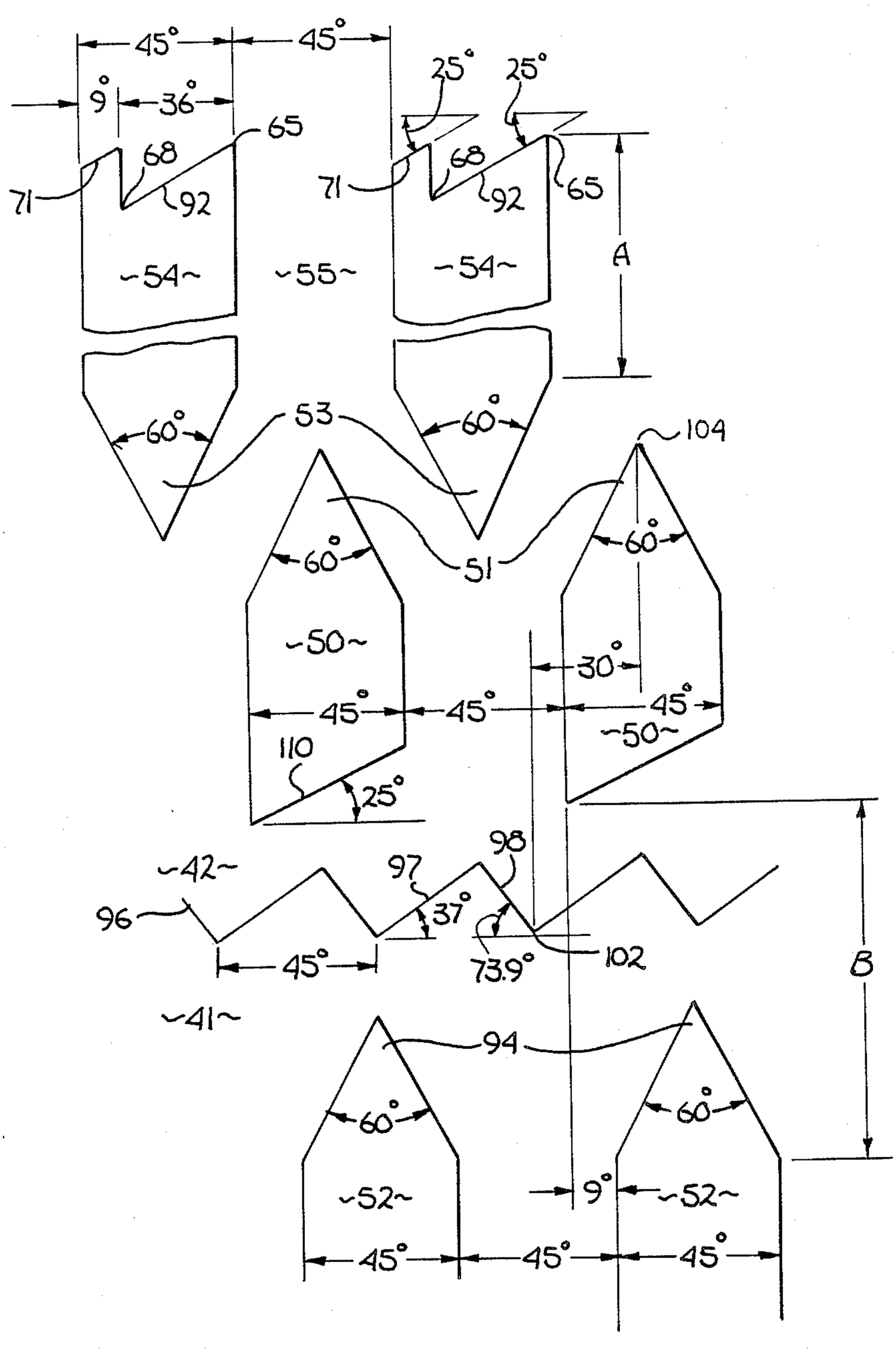

45°
45°
9°
36°
65
68
71
92
54
55
25°
25°
A
60°
53
104
51
50
30°
110
25°
42
96
97
98
37°
45°
73.9°
102
B
41
94
52
9°

Fig. 10

HANDGUN SAFETY DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to the field of safety device for handguns, and more particularly to devices for the prevention of accidental discharge of handguns.

2. Prior Art

The unintentional discharge of a handgun has been a source of needless injury for many years. Children playing with guns found in the home have been injured or killed at an alarming rate due to accidential firings. Numerous procedures and devices have been suggested to render a firearm "safe" or inoperative in order to prevent accidental firings. In most cases, attempts to prevent accidental dischage require that the firearm be disassembled or maintained in an unloaded condition. Accordingly, the firearm must be reassembled or loaded prior to use. Since most handguns are kept by owners for protection against emergency situations such as the entry of an intruder in the home, it is desirable that the firearm be rendered operable as quickly as possible.

U.S. Pat. No. 4,569,144, entitled "Handgun Safety Device", issued to this inventor discloses a quick release safety device for handguns, which permits a gun to be safely stored in a loaded and fully assembled condition. The device includes a rod which is inserted through the gun barrel and into the empty cartridge chamber. The rod is held in position by a cable which loops around the back of the gun. The device is removable by applying manual pressure to a cap at the front of the rod which depresses a spring and releases the tension on the cable. This device requires a suitable gripping point at the back of the gun and the exposed cable is subject to tampering.

As will be described, the present invention represents an improvement over the above-referenced patent, whereby the locking mechanism of the safety device is entirely within the gun.

SUMMARY OF THE INVENTION

The present invention is a firing safety device for handguns and is designed to prevent accidental discharge of a gun. The gun cannot be discharged with the safety device in position; however, the device can be removed quickly by application of manual pressure. The amount of pressure required to remove the device is greater than that which a child is physically capable of applying. A rod having a spindle at the end thereof is inserted into the barrel of the gun and a special cartridge is inserted in the firing chamber of the gun. The spindle penetrates the cartridge and is captured by traps molded on the inner surface of the cartridge. A rigid locking member thereby extends from the muzzle to the firing pin of the gun.

The rod is attached to a cap having a rubber bumper. The rod is inserted into the barrel of the gun and pressure is applied to the bumper, such as by pressing against a solid object. The cap encloses a muzzle spring which forces a muzzle stop against the muzzle of the gun. Pressure applied to the bumper compresses the muzzle spring and forces the rod and spindle into the barrel of the gun until the spindle engages the cartridge. The spindle and cartridge are heldin an engaged position by the force of the muzzle spring. To remove the device, pressure must again be applied to the bumper to compress the muzzle spring and release the spindle from the cartridge.

The invention thus provides a firing safety device to present the accidental discharge of the gun especially by children. Due to the amount of force required to compress the muzzle spring, the device cannot be removed by children under the age of approximately ten years. However, an adult can quickly remove the device to permit the gun to be fired in an emergency situation.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side view of a handgun showing the locking device and cartridge (in ghost lines) of the present invention in place.

FIG. **2** is a partial enlarged cross-sectional view of FIG. **1**.

FIG. **3** illustrates the cartridge and locking device of the present invention as they are brought into engagement.

FIG. **4** is a cross section through line **4—4** of FIG. **3**.

FIG. **5** illustrates the cartridge and locking device of FIG. **3** as the spindle penetrates the cartridge.

FIG. **6** illustrates the cartridge and locking device of FIG. **3** in a locked position.

FIG. **7** illustrates the cartridge and locking device of FIG. **3** as they are being disengaged.

FIG. **8** illustrates the cartridge and locking device of FIG. **3** in a further stage of disengagement.

FIG. **9** illustrates the cartridge and locking device of FIG. **3** as the locking device is withdrawn from the gun.

FIG. **10** is a schematic view of the cartridge and locking device of FIG. **3** illustrating certain dimensions thereof.

FIG. **11** illustrates gun cleaning attachments which may be used in conjunction with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention is a safety device for handguns designed to prevent accidental discharges, especially by children. In the following description, for purposes of explanation, specific materials and configurations are set forth in order to provide a thorough understanding of the present invention. However, it will be apparent to one skilled in the art that the present invention may be practiced without these specific details.

Referring to FIG. **1**, the present invention includes a locking device **10** which is inserted into the barrel **18** of a handgun **12** and a cartridge **14** which is inserted into cylinder **16**. Although a revolver is illustrated in FIG. **1**, the present invention may also be used with other types of handguns, such as semi-automatics and automatics.

FIG. **2** illustrates locking device **10** inserted into barrel **18** and capturing cartridge **14**. Locking device **10** is gripped by cap **22** to insert rod **40** into barrel **18**. Bumper **24**, which is preferably made of a resilient rubber-like material, is placed against a solid surface, such as a wall or floor, and pressure is applied to gun **12** forcing muzzle **19** against muzzle stop **20**. Muzzle stop **20** telescopes over endpiece **32** and is retained by pin **34** riding in slot **36**. Muzzle stop **20** and endpiece **32** are biased apart by muzzle spring **26**. Further pressure on bumper **24** causes muzzle spring **26** to compress. Bumper **24** bears against endpiece **32** forcing rod **40** to penetrate further into barrel **18** until rod **41** penetrates cartridge **14** and is captured therewithin. Details of cartridge **14**

and rod end **41** which facilitate the capture of locking device **10** within cartridge **14** will be described below. With locking device **10** thus secured, operation of gun **12** is totally disabled. Cap **22** is free to rotate about endpiece **32** thereby rendering secured locking device **10** to tamper resistant.

Locking device **10** is removed from gun **12** by again applying pressure against bumper **24**. Further compression of muzzle spring **26** causes rod end **41** to penetrate further into cartridge **14** and be released. Locking device **10** may then be withdrawn from barrel **18**. Muzzle spring **26** is sized such that a minimum of 40 pounds of pressure is required to release locking device **10**, thereby preventing its removal by children under the age of approximately ten years.

Referring now to FIGS. **3–10**, the detailed operation of the locking mechanism will be explained. As best shown in FIGS. **3** and **4**, cartridge **14** comprises a flanged hollow cylinder which fits within cylinder **16**. Four traps **54** are molded on the interior surface of cartridge **14** near the end opposite the flanged end. Traps **54** are disposed at 90° intervals about the interior circumference of cartridge **14**. Cartridge **14** has the approximate dimensions of a shell casing which gun **12** is designed to fire and is preferably made of a high-strength moldable material such as ABS plastic.

The outer dimensions of spindle **42** and rod end **41** are such that they slide within the cylindrical inner surface of cartridge **14**. Spindle **42** and rod end **41** are also preferably made of the same material as cartridge **14**. Rod end **41** is secured to rod **40** by means of threaded stud **43** as shown in FIG. **2**. Rod **40** may be of the same material as cartridge **14**, spindle **42** and rod end **41** or may be made of a different material such as aluminum or steel. The length of rod **40** is determined by the barrel length of the gun such that rod end **41** may penetrate cartridge **14**, as described below, upon compression of muzzle spring **26**. Coarse adjustment of the length of rod **40** may be accomplished by attaching one or more segments joined by threaded studs such as stud **43**. Fine adjustment of the length of rod **40** to account for variation in barrel lengths, such as exists between guns of different manufacturers, may be accomplished by partially unscrewing one of the rod segments or by means of a length adjustment (not shown) incorporated within one or more of the rod segments.

Spindle **42** is attached to rod end **41** by means of screw **46**. Spindle **42** is urged against rod end **41** by spring **48** which bears against spindle **42** within recess **44**. Mating surfaces **60** of rod end **41** and **62** of spindle **42** define a series of alternating ramped annular segments which repeat at 45° intervals about the circumference of rod end **41** and spindle **42**. When locking device **10** is not in use, the pressure applied by spring **48** causes surfaces **60, 62** to be everywhere engaged as illustrated in FIG. **3**. The travel of spindle **42** on screw **46** is sufficient to allow spindle **42** to be disengaged from rod end **41** so as to rotate freely thereabout but is limited to approximately one-half of the allowable travel of muzzle spring **26**, thereby assuring that muzzle spring **26** is partially compressed when locking device **10** is secured within gun **12**.

Dogs **50** are molded onto the external surface of spindle **42** and dogs **52** are molded onto the external surface of rod end **41**. Dogs **50** and **52** are disposed at 90° intervals about the circumference of spindle **42** and rod end **41** respectively. With surfaces **60, 62** fully engaged, dogs **50** are radially offset from dogs **52** by approximately 9°. Although the invention is described in terms of four each of traps **54**, dogs **50** and dogs **52**, it is to be understood that other number of these elements may be employed within the teaching of this disclosure subject to corresponding adjustments of the relates angular dimensions.

Particular dimensions of the described embodiment are schematically illustrated in FIG. **10**. Traps **54** are each 45° in extent as are spaces **55** separating adjacent traps. Notches **68** are 36° from corners **65** so that the radial dimension of surface **71** if 9°. Surface **71** and surface **92** of traps **54** are inclined by 25° from a plane perpendicular to the axis of cartridge **14**. Surface **110** of spindle dogs **50** is similarly inclined at an angle of 25° . Dogs **50** and **52** are all 45° in extent and separated from adjacent dogs by 45°. As described above, dogs **50** and **52** are radially offset by 9°. Tapered ends **51, 53** and **94** all have included angles of 60°.

Parting line **96**, defining mating surface **60, 62** of rod end **41** and spindle **42** respectvely, comprises a series of ramps **97** repeating at 45° intervals and inclined at 37° to a plane perpendicular to the axis of rod **40** alternating with ramps **98** inclined at approximately 73.9°. Point **102** of line **96** is radially located 30° from tip **104** of spindle dog **50**. In order to assure simultaneous alignement of dogs **50** and **52** in spaces **55** during insertion of locking device **10** into cartridge **14**, dimension "A" of FIG. **10** must be greater than dimension "B" by at least an amount corresponding to the axial displacement of spindle **42** resulting from a 9° rotation with respect to rod end **41**.

Referring now to FIG. **3**, as rod **40** in inserted in barrel **18**, tapered ends **51** of spindle dogs **50** contact tapered ends **53** of cartridge traps **54**. As further pressure is applied, spindle **42** rotates such that dogs **50** are aligned with spaces **55** between cartridge traps **54**. The path of dog **50** designated "A" in FIG. **3** as it penetrates cartridge **14** is shown generally by the dashed arrow. As spindle **42** rotates, ramped surface **62** of spindle **42** slides along ramped surface **60** of rod end **41**, thereby creating gap **80** and partially compressing spring **48**. With spindle dogs **50** aligned with spaces **55**, rod **40** may be further inserted so that dogs **52** are received within spaces **55** as shown in FIG. **5**. At this point, corner **63** of spindle dog **50** just clears corner **65** of cartridge trap **54**. Pressure applied by compressed spring **48** causes surface **62** to slide with respect to surface **60**, thereby closing gap **80** and causing spindle **42** to rotate in the direction shown by the arrow in FIG. **5**. As spindle **42** thus rotates, ramped surface **64** of spindle dog **50** engages ramped surface **66** of cartridge trap **54**.

The engagement of surfaces **64, 66** prevent spindle **42** from being withdrawn from cartridge **14**. As pressure against bumper **24** is released, muzzle spring **26** forces rod **40** to withdraw. Spindle **42** continues to rotate until corner **63** of spindle dog **50** engages notch **68** of cartridge trap **54** as shown in FIG. **6**. At this point, the engagement of spindle dog **50** and notch **68** prevent further rotation of spindle **42**. The angles of ramped surfaces **60, 62** and the location of notch **68** on trap **50** as illustrated in FIG. **10** are so related that when spindle dog **50** rests within notch **68**, spindle **42** has rotated through an angle sufficient to cause point **82** of surface **62** to rotate beyond point **84** of surface **60** as indicated by "D" in FIG. **6**. Rod **40** is withdrawn by the relaxation of muzzle spring **26** until screw **46** seats against spindle **42**. Locking device **10** is then firmly secured

wtihin gun **12** by the remaining compression of muzzle spring **26**.

Locking device **10** is removed by again applying pressure against bumper **24** to compress muzzle spring **26** and force rod **40** further into barrel **18**. Referring to FIG. 7, as rod **40** is forced in the direction shown by the arrows, ramped surface **60** of rod end **41** contacts ramped surface **62** of spindle **42**. Spindle **42** is thereby forced further into cartridge **14** such that corner **63** of spindle dog **50** clears corner **69** of cartridge trap **54** as shown in FIG. **8**. Pressure applied by spring **48** again causes surface **62** to slide with respect to surface **60**, thereby closing gap **86** and causing spindle **42** to further rotate in the direction shown by the arrow in FIG. **8**. Spindle **42** continues to rotate and move axially against rod end **41** until gap **86** is fully closed. At this point, surface **64** of spindle dog **50** will be in contact with surface **71** of trap **54**. Continued withdrawal of rod **40** from the gun barrel due to the force of the muzzle spring will cause surface **60** of rod end **41** to separate from surface **62** of spindle **42** in an axial direction and will cause spring **48** to compress. Surface **64** of spindle dog **50** will slide with respect to surface **71** of trap **54**, causing spindle **42** to further rotate in the direction of the arrow shown in FIG. **8**.

Spindle **42** continues to rotate until spindle dog **50** strikes surfrace **72** of trap **54** as shown in FIG. **9**. At this point, spindle dogs **50** are again aligned with spaces **55** in cartridge **14** such that locking device **10** may be withdrawn from gun barrel **18**. It should be noted that spindle **42** as portrayed in FIG. **9** has rotated a full 90° from its position shown in FIG. **5**.

When locking device **10** is withdrawn from barrel **18** of gun **12**, gun **12** is in condition to be fired. In the case of a revolver, cylinder **16** may be rotated by the firing mechanism to a chamber containing a live round. In the case of an automatic, movement of the slide will eject cartridge **14** and permit a live round to enter the firing chamber.

Locking device **10** may be adapted for use as a gun cleaning tool by use of attachments as shown in FIG. **11**. Cloth holder **120** and bore brush **122** may be threaded onto rod **40** in place of rod end **41** when it is desired to periodically clean the gun.

While the present invention has been particularly described with reference to FIGS. **1–11**, and with primary emphasis on handguns, it should be understood that the figures are for illustation only and not as a limitation upon the invention. It is contemplated that many changes and modifications may be made by one of ordinary skill in the art to the materials and arrangements of elements of the invention, without departing from the spirit and scope of the invention.

I claim:

1. A device for preventing the discharge of a firearm, said firearm having a barrel, a muzzle and a cartridge chamber, said device comprising:

a rod including an inner and an outer end, said rod insertable in the barrel through the muzzle with the outer end extending from the muzzle;

spring means coupled to the rod and disposed against the muzzle when the rod is inserted into the barrel for urging the rod to withdraw from the barrel;

a cartridge disposed in said cartridge chamber;

locking means coupled to the inner end of the rod for engaging the cartridge and locking thereto as said rod is inserted into the barrel such that said spring means is partially compressed;

a spindle disposed at said inner end of said rod said spindle coupled to said rod by retaining means such that the spindle may rotate with respect to the rod about a common longitudinal axis;

said spring means comprising:

a cap coupled to said outer end of said rod and freely rotatable thereabout, said cap including a bumper;

a muzzle stop disposed against said muzzle of said barrel when said rod is inserted into said barrel; and

a muzzle spring disposed between and biasing apart said cap and said muzzle stop.

2. The device of claim **1** wherein said spindle includes a first dog having an anterior surface and disposed on the circumference of said spindle and said rod includes a second dog disposed on the circumference of said rod.

3. The device of claim **2** wherein said spindle and said rod each include a mating surface comprising a plurality of inclined annular segments, whereby rotation of the spindle with respect to the rod imparts a reciprocating motion to the spindle along the longitudinal axis thereof.

4. The device of claim **3** wherein said retaining means includes a spindle spring to urge said spindle against said rod at said mating surfaces.

5. The device of claim **4** wherein said first and second dogs are disposed such that said first and second dogs are not radially aligned when said mating surfaces are fully engaged.

6. The device of claim **5** wherein said cartridge includes an inner cylindrical surface having a plurality of traps disposed thereon and spaced apart such that said first and second dogs may pass therebetween.

7. The device of claim **6** wherein said traps include a notched posterior surface such that, when said spindle and said rod are inserted in said cartridge such that said second dog is inserted between said traps, said anterior surface of said first dog engages said notched posterior surface of one of said traps, whereby said spindle is prevented from being withdrawn from said cartridge.

8. The device of claim **7**, wherein said inclined annular segments of said mating surfaces are disposed such that, when said anterior surface of said first dog is engaged with said notched posterior surface of one of said traps and said rod is inserted within said cartridge, said spindle is rotated such that said first dog may pass between said traps, thereby permitting the spindle to be withdrawn from said cartridge.

9. The device of claim **1** further comprising engagement means coupled to said locking means for causing said locking means to engage said cartridge as a first axial force is applied against said outer end of said rod.

10. The device of claim **9**, further comprising disengagement means coupled to said locking means for causing said locking means to disengage said cartridge as a second axial force is applied against said outer end of said rod.

11. The device of claim **10** wherein said second axial force is greater than approximately forty pounds.

12. The device of claim **7**, further comprising cleaning means threadably attached to said inner end of said rod for cleaning said barrel of said firearm.

13. The device of claim **1** wherein said rod comprises a plurality of longitudinal segments threadably attached one to another.

* * * * *